

WHAT IS CLAIMED IS:

1. A method for communicating across divergent network segments in a network, the network including a first network segment and a second network segment, the first network segment including a switch having a module, the module executing said method comprising the steps of:

receiving a ARP request packet from a first device, said ARP request packet including a request to locate a second device, wherein said first device is coupled to said first network segment and said second device is coupled to said second network segment;

broadcasting said ARP request packet to network segments outside of said first network segment;

acquiring a reply from said second network segment; and

transmitting said reply to said first device, such that in use, ARP tables are modified on said first device and said second device so that future communication between said first device and said second device is enabled using a layer two communication protocol without any requirement for a layer three communication protocol.

2. The method of claim 1, wherein said ARP request packet includes a first MAC address associated with said first device, a first IP address associated with said first device, and a second IP address associated with a second device.

3. The method of claim 2, wherein said broadcasting step comprises:

converting said first MAC address to a first specialized multicast MAC address;

modifying said ARP request packet to a multicast ARP request containing said first specialized multicast MAC address, and said first and second IP addresses; and

sending said multicast ARP request to all network segments outside of said first network segment.

4. The method of claim 3, wherein said acquiring step further comprises accepting an ARP reply from said second network segment, the ARP reply originating from said second device and the ARP reply including, as a source address, a second specialized multicast MAC address that represents said second device, the ARP reply further including said first specialized multicast MAC address as well as said first and second IP addresses.

5. The method of claim 4, wherein, before said second network segment sends said ARP reply to said first network segment, said ARP reply is converted by a switch in said second network segment so that the ARP reply packet source indicator is changed from the MAC address of said second device to said second specialized multicast MAC address.

6. The method of claim 5, further comprising:
adding a first ARP table entry to the ARP table of said first device, the first ARP table entry associating said second IP address with said second specialized multicast MAC address; and
adding a second ARP table entry to the ARP table of said second device, the second ARP table entry associating said first IP address with said first specialized multicast MAC address.

7. The method of claim 6, further comprising:
utilizing a MAC switch and said first and second ARP table entries to forward data packets addressed to said first and second specialized multicast MAC addresses, wherein:

 said MAC switch converts packets addressed to said first specialized MAC address so that they are addressed to the MAC address of said first device, and

 said MAC switch converts packets addressed to said second specialized MAC address so that they are destined to the MAC address of said second device.

8. The method of claim 1, further comprising utilizing a single IP subnet for both said first network segment and said second network segment.

9. A network that supports communication across divergent physical interfaces, said network including a first network segment and a second network segment, said first network segment including a switch and one or more devices, said switch including a module for routing packets; said module including:
- instructions for receiving a broadcast request MAC(PC1) from a first device that is directed to a second device, wherein said first device is coupled to said first network segment and said second device is coupled to a said second network segment;
 - instructions for converting said broadcast request MAC(PC1) to a modified multicast request MCAST(MAC(PC1));
 - instructions for storing the identity relationship between MAC(PC1) and MCAST(MAC(PC1));
 - instructions for broadcasting MCAST(MAC(PC1)) to all network segments outside of said first network segment;
 - instructions for acquiring a reply packet directed to MCAST(MAC(PC1)) that ultimately originated from said second device; and
 - instructions for forwarding said reply packet to PC1 based on the identity of MAC(PC1) and MCAST(MAC(PC1)) that was preserved by said instructions for storing.

10. A network that facilitates communication across divergent network segments, the network including a first network segment and a second network segment, the first network segment including a switch, the switch including a module, said module comprising:

- instructions for receiving a ARP request packet from a first device to locate a second device, wherein said first device is coupled to said first network segment and said second device is coupled to said second network segment;
- instructions for broadcasting said ARP request packet to network segments outside of said first network segment;
- instructions for acquiring a reply from said second network segment; and
- instructions for transmitting said reply to said first device, such that in use, ARP tables are modified on said first device and said second device so that future

communication between said first device and said second device is enabled using a layer 2 communication protocol and without any requirement for a layer 3 communication protocol.

11. The network of claim 10, wherein said ARP request packet includes a first MAC address associated with said first device, a first IP address associated with said first device, and a second IP address associated with a second device.

12. The network of claim 11, wherein said instructions for broadcasting comprise: instructions for converting said first MAC address to a first specialized multicast MAC address;

instructions for modifying said ARP request to a multicast ARP request containing said first specialized multicast MAC address, and said first and second IP addresses; and

instructions for sending said multicast ARP request to all network segments outside of said first network segment.

13. The network of claim 12, wherein said instructions for acquiring further comprise instructions for accepting an ARP reply from said second network segment, the ARP reply originating from said second device and the ARP reply including, as a source address, a second specialized multicast MAC address that represents said second device, the ARP reply further including said first specialized multicast MAC address as well as said first and second IP addresses.

14. The network of claim 13, wherein, before said second network segment sends said ARP reply to said first network segment, said ARP reply is converted by a switch in said second network segment so that the ARP reply packet source indicator is changed from the MAC address of said second device to said second specialized multicast MAC address.

15. The network of claim 14, wherein:

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said first device includes a module that comprises instructions for adding a first ARP table entry to the ARP table of said first device, the first ARP table entry associating said second IP address with said second specialized multicast MAC address; and

said second device includes a module that comprises instructions for adding a second ARP table entry to the ARP table of said second device, the second ARP table entry associating said first IP address with said first specialized multicast MAC address.

16. The network of claim 15, wherein a MAC switch and said first and second ARP table entries are utilized to forward data packets addressed to said first and second specialized multicast MAC addresses, wherein:

said MAC switch converts packets addressed to said first specialized MAC address so that they are addressed to the MAC address of said first device, and

said MAC switch converts packets addressed to said second specialized MAC address so that they are destined to the MAC address of said second device.

17. The network of claim 11, further comprising utilizing a single IP subnet for said first network segment and said second network segment.

18. The network of claim 17, wherein said network has a limited number of routeable IP addresses and the association of said first IP address with said first device and the association of said second IP address with said second device conserves a pool of allocatable routeable IP addresses.

19. The network of claim 17, wherein said utilization of a single IP subnet for said first network segment and said second network segment conserves the number of IP addresses used across a plurality of network segments in said network.